

## ABSTRACT

Conventional deformable elements of a motor vehicle are not able to absorb large impact energy in front, side or rear collision [11, 12]. The large area of the vehicle floor between the front and rear bumper is exploited to accommodate at least one deformable element. Its front and rear portion is connected to a pair of front and rear piston devices, which independently operate to deform the deformable element in any front or rear collision. Passengers are protected by the deformable element, abutting along both vehicle sides, in side collision. The deformable element is subdivided into a number of crumpling zones, provided with sites of predetermined fracture, which, in juxtaposition, have unequal stiffness in order to control the rate of deceleration.

In the second feature of invention, engaging and mating parts of interengaging assemblies define the crumpling zones of the first deformable element, responsible for energy absorption in front- or rear collision, and of the second deformable element, responsible for energy absorption in side collision, thus cutting the assembly costs and time and increasing the energy-absorbing masses in any collision.

In the third feature, an upper and lower deformable floor of trunk compartment, a pair of runners and a pair of rear wheel cases define storage rooms, covered by the respective releasable members of the upper floor.

In the fourth feature, a pair of springs of the piston devices stores minor energy, when the bumper is loaded, and moves the bumper, when unloaded, to the home position.

## OTHER PUBLICATIONS

- [1] Beitrag zur rechnerunterstützten Auslegung und Dimensionierung von Schraubendruckfedern mit beliebigen Kennlinien (Go, Schriftenreihe 81.3, Ruhr-Universität Bochum)
- [2] Problematik der Auslegung von Schraubendruckfedern unter Berücksichtigung des Abwälzverhaltens (Go, Automobil-Industrie 3/82, pp.359-367)
- [3] Zum Schwingungsverhalten von Schraubendruckfedern (Go, ATZ 84 (1982) pp.223-226)
- [4] Programmsystem AOSK zur Verformungs- und Spannungsanalyse einseitig abwälzender, strukturell unsymmetrischer Tonnenfeder (Go, Konstruktion 35 (1983) H.8, pp.307-312)
- [5] Fahrwerktechnik I und II (Reimpell, Vogel-Verlag, Würzburg)
- [6] AMS (German Car Magazin Auto Motor und Sport, in USA available) 19/91
- [7] AMS 26/96
- [8] AMS 25/96
- [9] AMS 23/97
- [10] AMS 9/99
- [11] Police report of 01/17/99 regarding fatal injury of the driver of MB C200 crashed by a VW Passat in an accident outside of the city Idstein
- [12] 53-page report of 2nd version "A million injuries and \$ billion loss per year due to failure of prior art and insufficient R&D work" by Go, forwarded to the US-Congress, US Secretary of Transport Rodney Slater and NHSTA